

# ADEMCO

## INSTALLATION INSTRUCTIONS

**No. 1876-2**  
**PASSIVE INFRARED**  
**MOTION DETECTOR**

**GENERAL INFORMATION**

The No. 1876-2 PIR provides 12 zones of wide-angle coverage with a range of up to 40 feet (12.2m), or long range/curtain coverage with a range of up to 80 feet (24.4m) and has the following important features:

- Dual element pyroelectric sensor
- Low current drain which allows for extended system power source battery life
- Horizontally adjustable optical system for accurate aiming of protection pattern
- Silent SPDT relay
- Wall/corner mounting plate
- 12VDC operation

The optical system divides the area into a series of protected zones. A dual element sensor measures the level of infrared energy in each zone. When an intruder crosses or enters any zone, a signal will be generated in response to the change in infrared energy, and the LED on the unit will light.

The PIR is designed to operate at all times and must be powered from a filtered 12VDC source that can provide at least 4 hours of standby power.

**COVERAGE CONSIDERATIONS AND TYPICAL LAYOUTS**

The range will depend upon the mirror system in use. Protective patterns are shown in Diagrams 1 and 2 for a normal mounting height of 7 ft (2.1m). The unit may be mounted higher for increased range but mounting above 8.5 ft (2.6m) is not recommended.

**"Dead Zone" Caution:** Note in Diagram 1 that a "dead zone" is indicated within which a person could be moving and not be detected by any of the unit's protective zones. Other dead zones may occur between the detector and the downward fields of view as the unit's mounting height is increased.

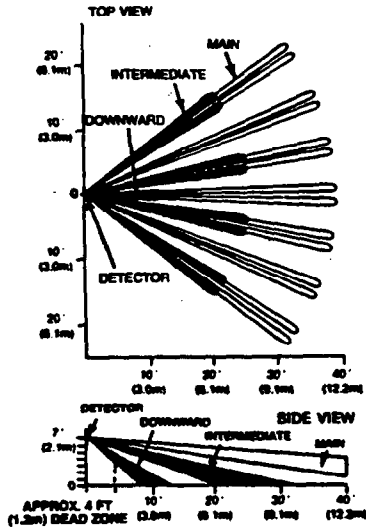


Diagram 1: WIDE ANGLE PROTECTION PATTERN

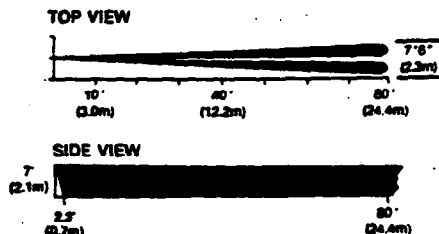
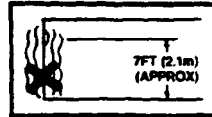


Diagram 2: LONG RANGE/CURTAIN MIRROR COVERAGE

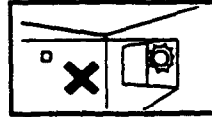
**Selecting a Mounting Location:**

The Passive Infrared Detector responds to changes in energy which occur when an intruder moves into or out of a protective zone. Best coverage will be obtained if the mounting site is selected such that the likely direction of intruder motion is ACROSS the pattern.

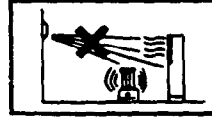
Passive I.R. units are remarkably resistant to false alarm hazards, but the following recommendations should be observed:



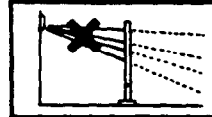
Install the detector at a height of approximately 7 feet (2.1m) from floor. Do not mount on an unstable surface.  
**IMPORTANT:** Avoid running alarm wiring close to heavy-duty electrical power cables.



Do not install where the detector is exposed to direct sunlight or directly above strong sources of heat.



Avoid locating a unit in areas which contain objects likely to produce a rapid change in temperature, such as central heating, radiators or ducts (or heaters of any kind), air conditioners, open flame, etc.



Make sure the detection area does not have obstructions (curtains, screens, large pieces of furniture, plants, etc.) which may block the pattern of coverage.

**INSTALLATION**

**A. Changing From Wide Angle to Long Range Coverage:**

1. Remove front cover by inserting a screwdriver blade in the groove between cover and base at one of the locations shown in Diag. 3, rotating blade to override snap fit, and then lifting cover off.
2. Spread either or both plastic prongs holding the wide angle (40 ft (12.2m)) mirror and remove the mirror (Diag. 4).
3. Insert one side of the long range (80 ft (24.4m)) mirror under a prong and snap the other side under the other prong. Make sure that the mirror sides are squarely in their corner rests and are held securely under the prongs.

**NOTE:** Mirror surface should be free of dirt, foreign matter and fingerprints. Use a clean dry soft cloth to wipe mirror surfaces, if required.

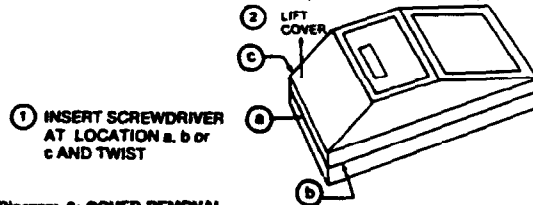


Diagram 3: COVER REMOVAL

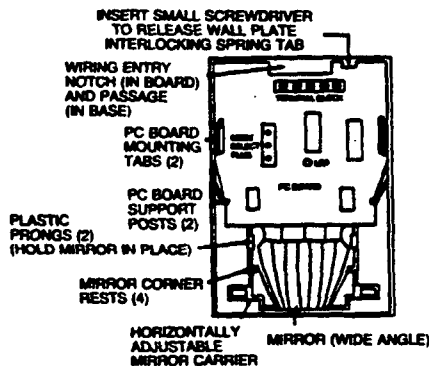


Diagram 4: INTERIOR OF DETECTOR

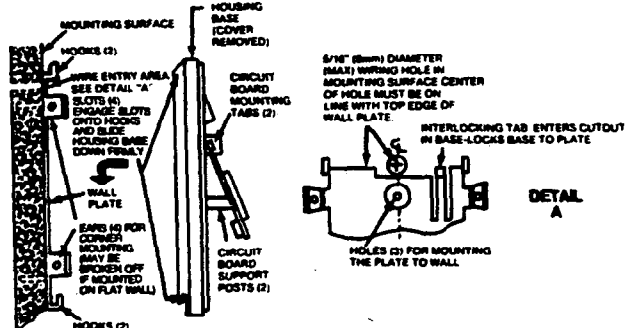


Diagram 5: MOUNTING DETAILS

**B. Normal Mounting:**

1. Remove the cover as shown in Diagram 3.
2. Mount the wall plate to a firm vertical surface (flat on wall or in corner). Position the plate so that field wiring is centered in the rectangular slot at the top of the plate (wall wiring hole no larger than 5/16" (8mm) diameter). See Diagram 5 and Detail A.
3. Feed wiring through top access hole of detector but do not connect to terminal block yet.
4. Attach unit to wall plate by engaging all four hooks on the plate into slots on the rear of the base and by pressing downward (see Diagram 5).  
NOTE: The PIR is locked to the wall plate by a spring tab that engages a small opening in the housing base (see Diag. 5). The PIR can only be removed by cover removal, depression of the tab from the inside with a small-blade screwdriver and then sliding the PIR upward (see Diag. 4).

**C. Coverage Adjustment:**

The PIR is equipped with a movable mirror carrier which allows adjustment of the coverage pattern in the horizontal direction after the unit is mounted. See Diagram 4. Although it can be used in conjunction with other mirror, this feature is particularly useful when using the Long Range/Curtain Mirror because it can compensate for mounting on an uneven wall, and cause a coverage aiming down long corridors through doorways, and around obstructions. Adjustment is accomplished by depressing one of the rectangular plastic caps at the lower left and right sides of the mirror carrier. This pivots the mirror assembly to the left or right.

**D. Mounting Without Wall Plate**

The PIR may be mounted on a flat wall or in a corner directly (without using the wall plate). Two pairs of bracket arms are provided on the housing base, just above the mirror, where mounting screws can penetrate the plastic. These are accessible by removing the cover base against the circuit board mounting tabs shown in Diagrams 4 and 5.

Do not open the knockout areas unless they are used for mounting, with the heads of the mounting screws completely clearing the openings.

For flat wall mounting, a wiring passage is provided at the rear of the housing base to enable circuit wires to be routed into the PIR's wire entry area from a wiring hole in the mounting surface (the base should be centered on the wiring hole).

After the base is mounted, the knockout covers should be carefully replaced. Align the notches at the left and right edges of the small base with the base's mounting tabs and make certain that the protrusions on the covers fully engage the slots in the mounting tabs. In addition, the base should rest securely on the two support posts, and the wiring entry notch at the base's upper edge should rest on the long wall of the wiring entry passage (see Diagrams 4 and 5).

**E. Ceiling Mounting:**

The versatility of the PIR permits ceiling-mounting as an alternative to the wall mounted configurations described above.

Mounting the unit on the ceiling, using the Long Range/Curtain Mirror, can provide a 15 to 18 ft (4.6 to 5.5m) forward-facing "curtain" pattern as illustrated in Diagram 6.

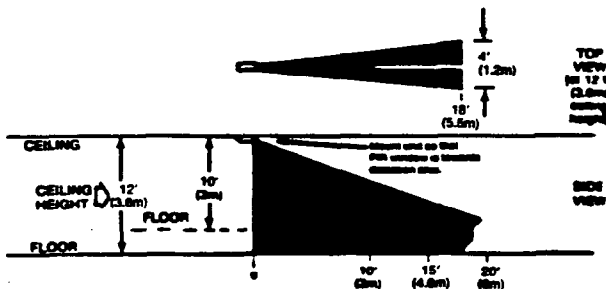


Diagram 6: CEILING MOUNTED UNIT USING LONG RANGE ('CURTAIN') MIRROR.

**F. Inverted Mounting:**

If small pets have access to the area protected by the detector, this section pertains.

The detector may be installed approximately 3 to 3 1/2 ft (0.9 to 1.1m) from the floor, provided furniture or other objects do not obscure the pattern of protection.

The detector and wall plate must be mounted inverted (the PIR window at the top) with the wall plate tilted forward (downward). Four self-adhesive rubber spacers have been provided to aid in tilting the wall plate.

It must be noted that although this procedure adjusts the PIR zones so that small animals will not be detected, a crawling intruder will ALSO go undetected.

1. The spacers are to be used with the wall plate only when the wide angle mirror is in use.

**Mounting flat on a wall:**

Stack two spacers between the wall and each of the two mounting bosses on the rear of the wall plate at the end opposite to the wiring entry.

**Corner mounting:**

Affix one of the spacers to the rear surface of each of the two corner mount tabs on the wall plate, on the end opposite to the wire entry access cutout.

2. Follow the "Normal Mounting" steps 2, 3 and 4 described previously, but orient the wall plate so that the wire entry access cutout in the wall plate is positioned at the bottom.

3. When the detector is mounted in an inverted position, those portions of the detector mirror which normally provide downward beams of protection will now provide beams that point upward. This will apply to both mirrors (long range and wide angle). If possible, install the detector so that these now upward-pointing beams are not directed at ceiling areas that include heating or air conditioning ducts and vents or light fixtures. If these IR sources cannot be avoided, the upward-pointing segment of the mirror should be masked to avoid the possibility of false alarms. See the section on Mirror Masking later in this document.

**G. Zone Location:**

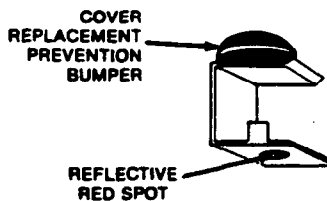


Diagram 7: ZONE LOCATOR

**Installation:**

1. Remove the detector's cover.
2. Install the zone locator as follows (refer to Diagram 8).
  - A. Locate the foam cushion at the rear of the detector element and rest the upper edge of the zone locator against its surface as shown in the diagram.
  - B. Pivot the zone locator into place. The upper (rubber bumper) portion should be flat against the foam cushion and the lower (red spot) portion should be flat against the detector element.

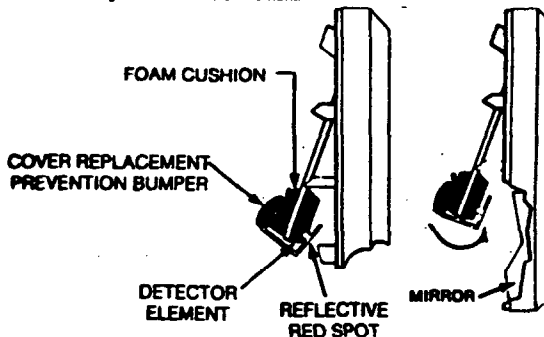


Diagram 8: INSTALLATION OF ZONE LOCATOR

**Use:**

With the zone locator temporarily installed as described above, the image of the zone locator's reflective red spot (see Diagram 9) can be seen reflected in the various facets of the detector's mirror by a person looking back at the unit from the zone of protection. When the red spot is visible in a particular portion of the mirror, the viewer is within that particular protection zone.

Note: In dimly lit areas, a flashlight aimed at the mirror from the viewer's position will make the red spot more visible.

Remove the zone locator when testing is completed and replace the detector's cover.

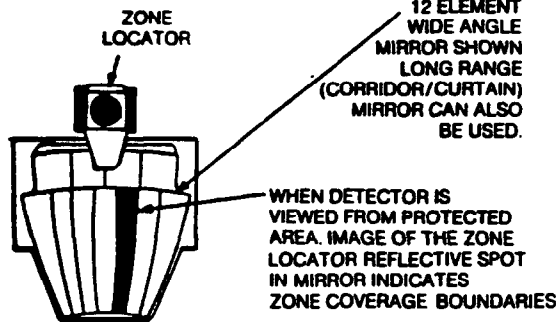


Diagram 9: TYPICAL REFLECTION

Note: The rubber bumper on the zone locator guards against replacement of the detector's cover with the zone locator still in place.

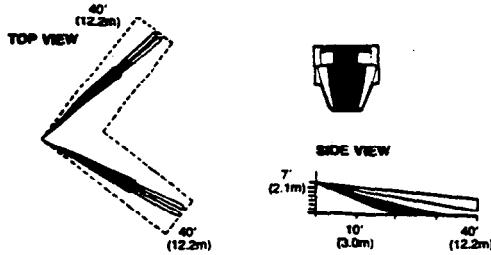
**M. Mirror Masking:**

The masking strips that have been supplied are designed for application to one or more mirror segments to produce a protection pattern that suits the particular requirements of the protected area. Simply peel off the appropriate pressure-sensitive adhesive strip(s) and apply over the desired mirror segment(s). Individual masking strips have been provided for each of the mirror segments on the wide-angle mirror. Two strips are provided for masking multiple segments of the long-range (curtain) mirror. Each mirror segment that is masked results in the elimination of one zone of protection from the coverage pattern. By masking appropriate segments of a mirror, you can adjust the coverage to suit the area to be protected or to eliminate coverage from areas where you anticipate environmental disturbances that might reduce the PIR's stability (a heater or other heat-producing object for example). Some examples of mirror masking are shown in Diagram 10.

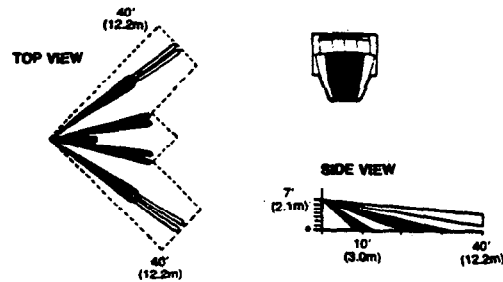
**IMPORTANT!** When hallway pattern masking is used, be sure the PIR is set for Instant Response Mode. Failure to do so may result in allowing an intruder to go undetected.

**Diagram 10: PROTECTION PATTERNS WITH MASKING SEGMENTS**

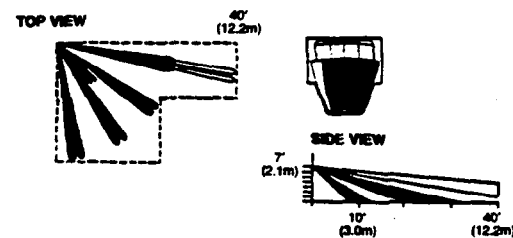
**DOUBLE HALLWAY**



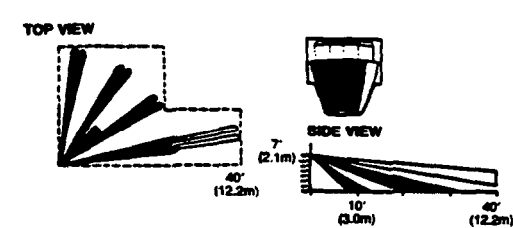
**DOUBLE HALLWAY AND SMALL ROOM**



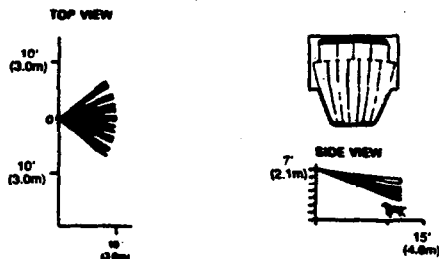
**SMALL ROOM & LEFT HALLWAY**



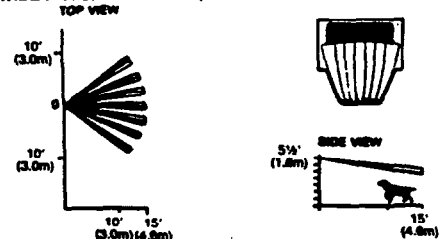
**SMALL ROOM & RIGHT HALLWAY**



**WIDE ANGLE PET ALLEY (PIR Mounted At 7 Ft. In A 10' x 10' Room)**



**WIDE ANGLE PET ALLEY (PIR Mounted at 5 1/2 Ft. In A 15' x 15' Room)**



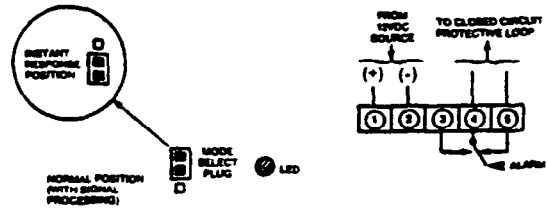
**NOTE:** If the hallway is less than 10 feet wide, the full 40 foot coverage will not be obtained, but will be slightly reduced. To minimize this effect, the mirror can be aimed left or right as described in the "Coverage Adjustment" section of this document.

The two mirrors included with the PIR, can be tailored to provide over six different coverage patterns as shown above, eliminating the need to purchase additional optics.

**WIRING CONNECTIONS**

Bring all wires in through the PIR's wiring entry near the terminal block and make connections as indicated in Diagram 11.

Power must be provided from a 12VDC filtered source with 22mA capability and at least 4 hours of standby battery capacity.



**Diagram 11: WIRING CONNECTIONS**

**Signal Processing:**

With the Mode Select Plug in the **NORMAL** position (See Diagram 11), the signal processing circuitry of the PIR provides maximum immunity against unwanted alarms caused by environmental disturbances, external electrical sources, heaters, etc. The detector will then normally signal an alarm within 3 to 4 steps, since the processing logic requires more complex motion than just a momentary event. When the detector verifies an intrusion, the alarm relay contacts will transfer for a few seconds. The LED operates independently of the processing circuitry and functions as a walk-test indicator. It will indicate any motion instantaneously.

With the Mode Select Plug in the **INSTANT RESPONSE** position, the delay involved in signal processing is eliminated. An instant alarm response (and lighting of the LED) is provided when an intruder enters any single protective zone. Use instant response mode when the long range mirror is installed or where the detector is used to protect narrow corridors, or where single protective zones are directed through doorways or room openings.

**TESTING**

**IMPORTANT:** Wait at least two minutes after applying power before attempting to walk-test unit.

Testing of the detector should be conducted with the protected area cleared of all people. In some business establishments, it may be more convenient to do this after the business is closed. The protective system's control should be disarmed during the procedure to prevent reporting unwanted alarms.

**Walk-Test:**

Replace the front cover and walk-test the unit. Test operation by walking through the protective zones and observing the walk-test LED. It will light whenever motion is detected.

The absolute range of all Passive IR units is subject to variation because of different types of clothing, backgrounds and ambient temperature. For this reason, ensure that the most likely intruder routes are well within the PIR's protective zones and that walk-testing is carried out along these routes.

**Walk-Test LED Disable:**

In some installations it may be desirable to disable the walk-test LED after the initial tests at installation, in order to prevent potential intruders from determining the exact limits of the protected area. This is easily accomplished by applying a small mask behind the LED diffuser in the cover of the PIR (an LED masking segment is included with the unit's Mirror Masking Strips described earlier). Subsequently, all periodic walk-testing must be in conjunction with the indicators of the associated control panel.

**TROUBLESHOOTING**

PROBLEM	PROBLEM CAUSE	REMEDY
Intermittent Alarm (LED operative)	Rapid temperature change. Check for electric or gas heaters, open flames, electric arcs, etc.	Locate source and reposition detector. Adjust mirror position.
	Drafts causing drapes, light fixtures, display material to move.	Eliminate source of motion.
Intermittent or Continuous Alarm (LED inoperative)	DC voltage supplied to detector is inadequate, intermittent, or polarity reversed.	Assure that proper polarity and adequate voltage is supplied and that wiring is intact (no opens or shorts) and connection secure.
	Protective loop is interrupted.	Determine whether interruption is in protective loop wiring or at detector's alarm relay contacts. Disconnect protective loop at detector relay contact terminals and check continuity across terminals. If present, check protective loop wiring. If absent at detector terminals (and proper voltage is supplied to the detector), return unit for service.
LED inoperative	LED masked	Remove mask
	LED malfunction. Check for broken/shorted leads.	Return unit for service
Detection Area Changes	Mounting surface is unstable. A few degrees of vertical shift can change range substantially.	Mount on secure surface.

## MAINTAINING PROPER OPERATION

In order to maintain the detector in proper working condition, it is important that the following be observed by the user.

1. Power should be provided at all times. Loss of power to the unit will result in the alarm contacts reverting to an alarm state. The unit's DC source should have standby power available for at least 4 hrs. of operation during emergencies.
2. Units should never be re-armed or relocated without the advice or assistance of the alarm service company.
3. The physical surroundings of the protected area should not be changed. If furniture or stock is moved, or air-conditioning or additional heating is installed, the system may have to be readjusted by the alarm service company.
4. Walk-test should be conducted frequently (at least weekly) to confirm continued proper coverage by each detector.

## SPECIFICATIONS

Detection Method:	Passive Infrared
Coverage:	40 ft (12.2m) x 50 ft (15.2m) (wide angle mirror) 80 ft (24.4m) x 7.5 ft (2.3m) (long range/curtain mirror)
Detection Zones:	12 zones (7 main, 4 intermediate, 1 downward) (wide angle mirror) 1 zone, 7 tiers (long range/curtain mirror)
Operating Modes:	Signal Processing/Instant Response (Installer selectable)
Detectable Walk Rate:	0.5 - 5 ft/sec. (0.15-1.5 m/sec)
Mounting Height:	7 ft nominal (2.1m), wall mounting
Indicator:	Red LED
Alarm Relay Contacts:	SPDT, 28VDC, 1A max.
Input Voltage:	12VDC (voltage reversal makes PIR inoperative)
Current Drain:	22 mA
Standby Capability:	Power source should be capable of at least 4 hours of battery standby.
Operating Temperature:	32°F to 122°F (0° to 50°C).
Operating Humidity:	Up to 95% RH (max.), non-condensing
Dimensions:	3-1/4" W x 4-3/4" H x 2" D (85mm x 120mm x 50mm)

## TO THE INSTALLER

Regular maintenance and inspection (at least annually) by the installer and frequent testing by the user are vital to continuous satisfactory operation of any alarm system.

The installer should assume the responsibility of developing and offering a regular maintenance program to the user as well as acquainting the user with the proper operation and limitations of the alarm system and its component parts. Recommendations must be included for a specific program of frequent testing (at least weekly) to insure the system's proper operation at all times.

## WARNING THE LIMITATIONS OF THIS PASSIVE INFRARED MOTION DETECTOR

While the Intrusion Detector is a highly reliable intrusion detection device, it does not offer guaranteed protection against burglary. Any Intrusion Detection device is subject to compromise or failure to warn for a variety of reasons:

- Passive Infrared Motion Detectors can only detect intrusion within the designed ranges as diagrammed in this installation manual.
- Passive Infrared Motion Detectors do not provide volumetric area protection. They do create multiple beams of protection, and intrusion can only be detected in unobstructed areas covered by those beams.
- Passive Infrared Detectors cannot detect motion or intrusion that takes place behind walls, ceilings, floors, closed doors, glass partitions, glass doors, or windows.
- Mechanical tampering, masking, painting or spraying of any material on the mirrors, windows or any part of the optical system can reduce the detection ability of the Passive Infrared Motion Detector.
- Passive Infrared Detectors sense changes in temperature; however, as the ambient temperature of the protected area approaches the temperature range of 90° to 105°F (32° to 40° C), the detection performance can decrease.
- This Passive Infrared Detector will not operate without appropriate DC power connected to it, or if the DC power is improperly connected (i.e., reversed polarity connections).
- Passive Infrared Detectors, like other electrical devices, are subject to component failure. Even though they are designed to last as long as 10 years, the electronic components could fail at any time.

We have cited some of the most common reasons that a Passive Infrared Motion Detector can fail to catch intrusion. However, this does not imply that these are the only reasons, and therefore it is recommended that weekly testing of this type of unit, in conjunction with weekly testing of the entire alarm system, be performed to ensure that the detectors are working properly.

Installing an alarm system may make one eligible for lower insurance rates, but an alarm system is not a substitute for insurance. Homeowners, property owners and renters should continue to act prudently in protecting themselves and continue to insure their lives and property.

We continue to develop new and improved protection devices. Users of alarm systems owe it to themselves and their loved ones to learn about these developments.

## ADEMCO SIX YEAR LIMITED WARRANTY (Applicable only to certain PIRs)

Alarm Device Manufacturing Company, a Division of Pittway Corporation, and its divisions, subsidiaries and affiliates ("Seller"), 165 Eileen Way, Syosset, New York 11791, warrants this PIR Detector to be in conformance with its own plans and specifications and to be free from defects in materials and workmanship under normal use and service for 72 months from the date stamp control on the product. Seller's obligation shall be limited to replacing, at its option, free of charge for materials or labor, a PIR which is proven not in compliance with Seller's specifications or proves defective in materials or workmanship under normal use and service. Seller shall have no obligation under this Limited Warranty or otherwise if the PIR is altered or improperly repaired or serviced by anyone other than the Ademco factory service. In case of defect, return the PIR to Ademco Distribution, Inc. or an authorized Ademco distributor for an immediate replacement.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. IN NO CASE SHALL SELLER BE LIABLE TO ANYONE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF THIS OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, OR UPON ANY OTHER BASIS OF LIABILITY WHATSOEVER, EVEN IF THE LOSS OR DAMAGE IS CAUSED BY THE SELLER'S OWN NEGLIGENCE OR FAULT.

Seller does not represent that its PIR may not be compromised or circumvented, that the PIR will prevent any personal injury or property loss by burglary, robbery, fire or otherwise; or that the PIR will in all cases provide adequate warning or protection. Buyer understands that a properly installed and maintained alarm may only reduce the risk of burglary, robbery or fire without warning but it is not insurance or a guarantee that such will not occur or that there will be no personal injury or property loss as a result. CONSEQUENTLY, SELLER SHALL HAVE NO LIABILITY FOR ANY PERSONAL INJURY, PROPERTY DAMAGE OR OTHER LOSS BASED ON A CLAIM THE PIR FAILED TO GIVE WARNING. HOWEVER, IF THE SELLER IS HELD LIABLE, WHETHER DIRECTLY OR INDIRECTLY, FOR ANY LOSS OR DAMAGE ARISING UNDER THIS LIMITED WARRANTY OR OTHERWISE REGARDLESS OF CAUSE OR ORIGIN, SELLER'S MAXIMUM LIABILITY SHALL NOT IN ANY CASE EXCEED THE PURCHASE PRICE OF THE PIR, WHICH SHALL BE THE COMPLETE AND EXCLUSIVE REMEDY AGAINST SELLER.

This warranty replaces any previous warranties and is the only warranty made by Seller on this PIR. No increase or alteration, written or verbal, of the obligations of this Limited Warranty is authorized.

# ADEMCO

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